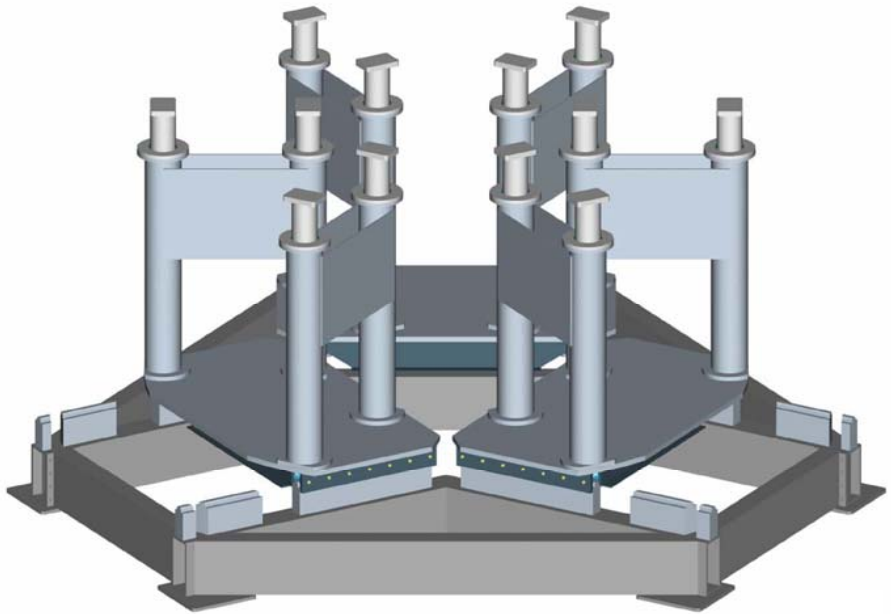
NCSX Machine Assembly

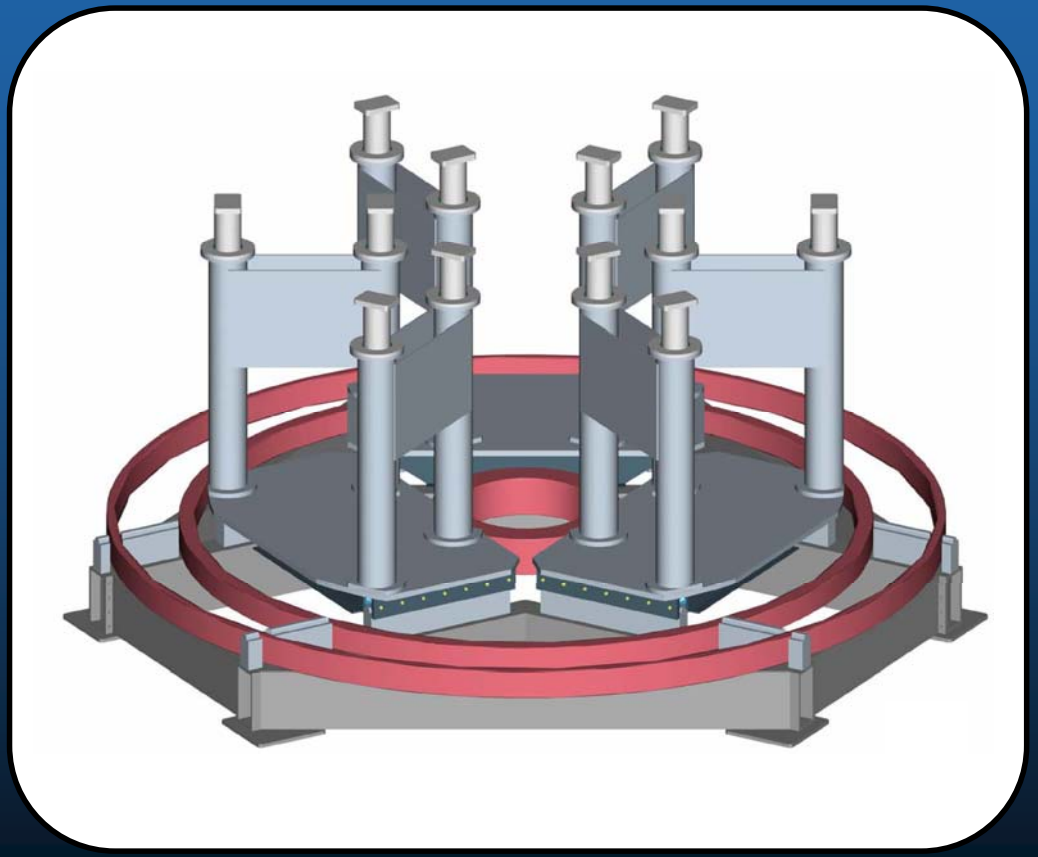
Machine Assembly Steps

- Set base on floor, level, and prepare for assembly
- Place PF 4, 5, and 6 on base
- Retract Base Carriage assembly
- Install Field Period Assembly #1
- Install Field Period Assembly #2
- Install Field Period Assembly #3
- Position Spool Piece and insulation
- Locate Field Period Assembly 1, 2, and 3. Weld Vacuum Vessel Spool Piece
- Raise lower PF 5 and 6. Install PF supports. Note: The installation of PF 5 & 6 require the port extensions to be removed before assembly
- Lift center stack and prepare for installation
- Install center stack and raise lower PF4 into position
- Position and mount upper PF4
- Install upper and lower External Trim Coils
- Install Neutral Beam Transition Duct
- Install Cryostat
- Stellarator Core Assembly Complete



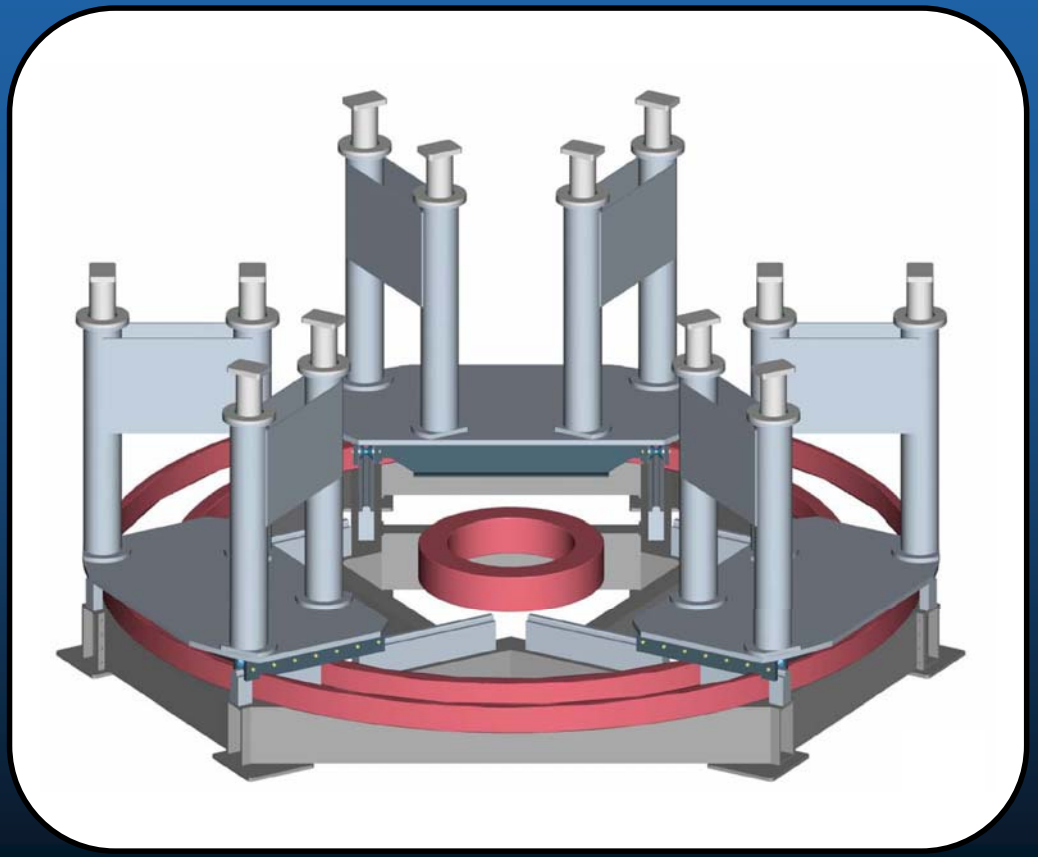
NCSX Machine Assembly Steps

- Position base in test cell and prepare for assembly
- Tooling balls or other measuring locations will be used to locate the fixture in the test cell.



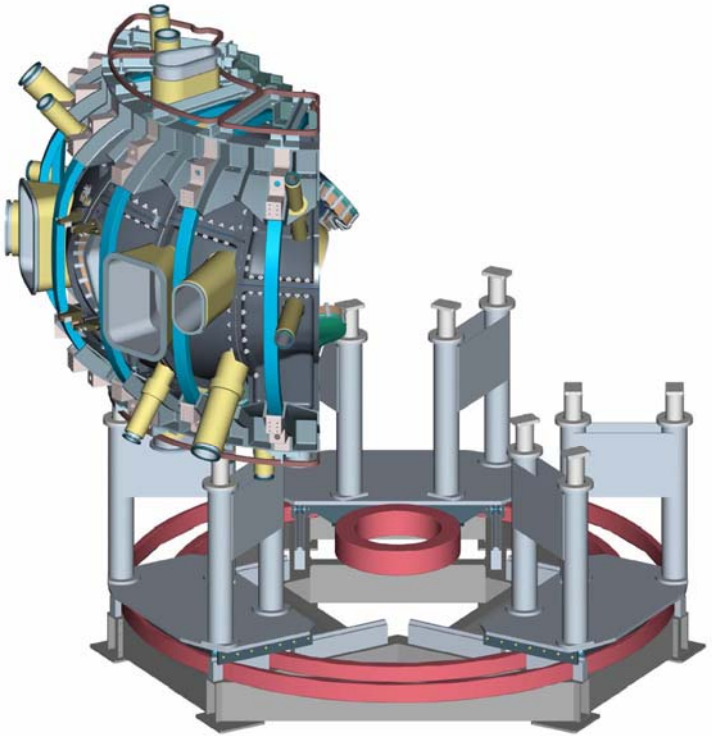
NCSX Machine Assembly Steps

- Place lower PF4, 5, and 6 on base
- The lower PF Coils are temporarily positioned on the base because the PF coils will not fit over the Field Period Assemblies once they are assembled.



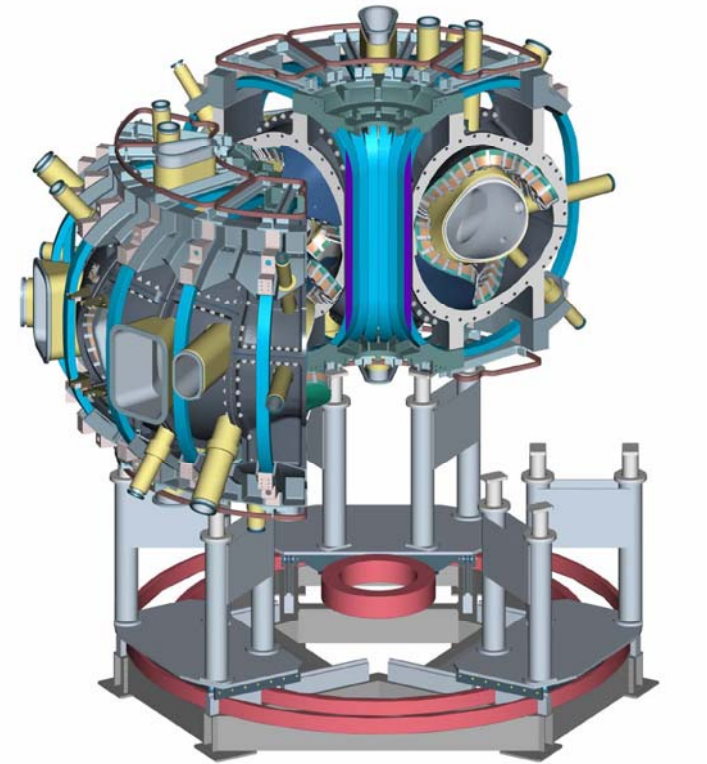
NCSX Machine Assembly Steps

- Retract Base Carriage Assembly
- The carriage assembly is retracted to for the placement of the Field Period Assembly



NCSX Machine Assembly Steps

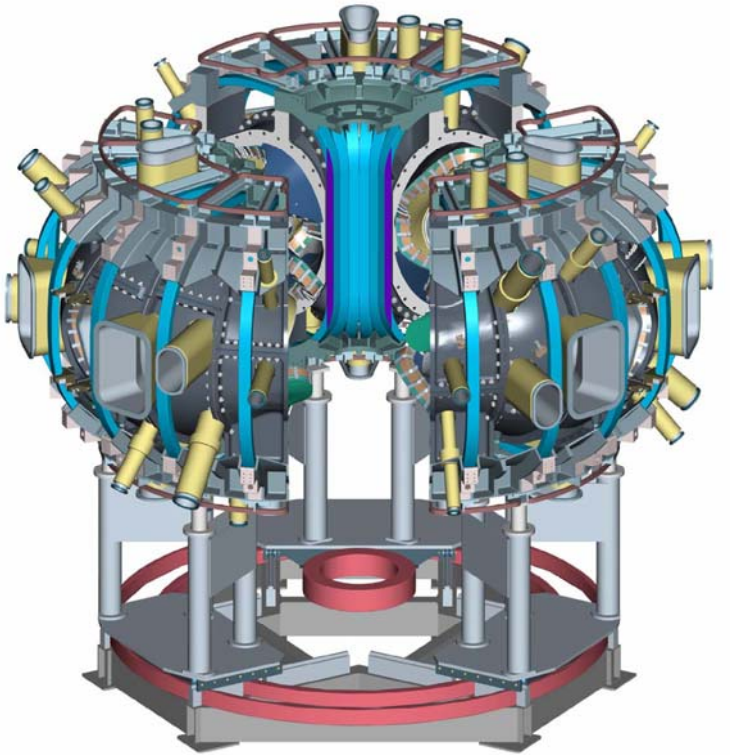
- Install Field Period Assembly #1
- The first Field Period Assembly is mounted to the carriage assembly on the base.
- Using positional location data obtained during the assembly of the Field Period Assembly the FPA will be aligned using targets that are located on the FPA



NCSX Machine Assembly Steps

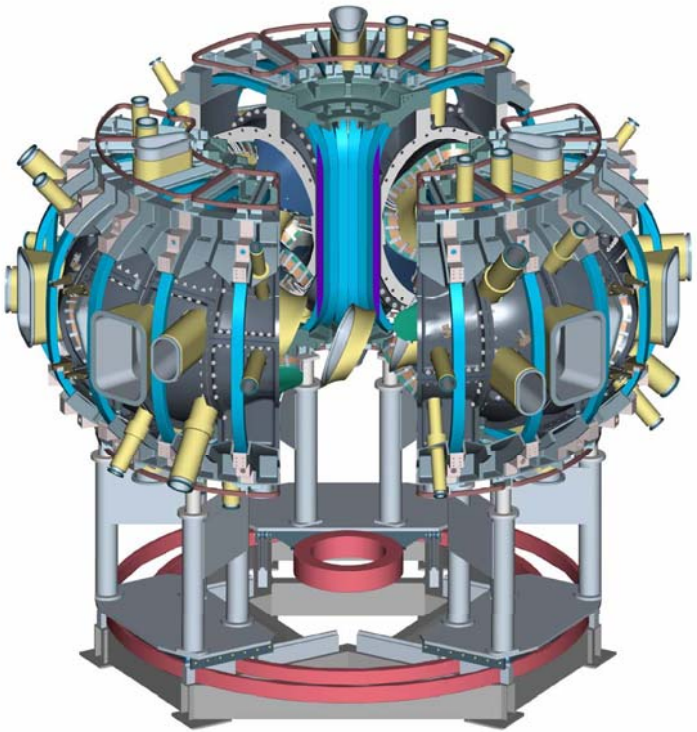
- Install Field Period Assembly #2
- The second FPA is mounted in the same way as FPA #1.

NCSX Machine Assembly



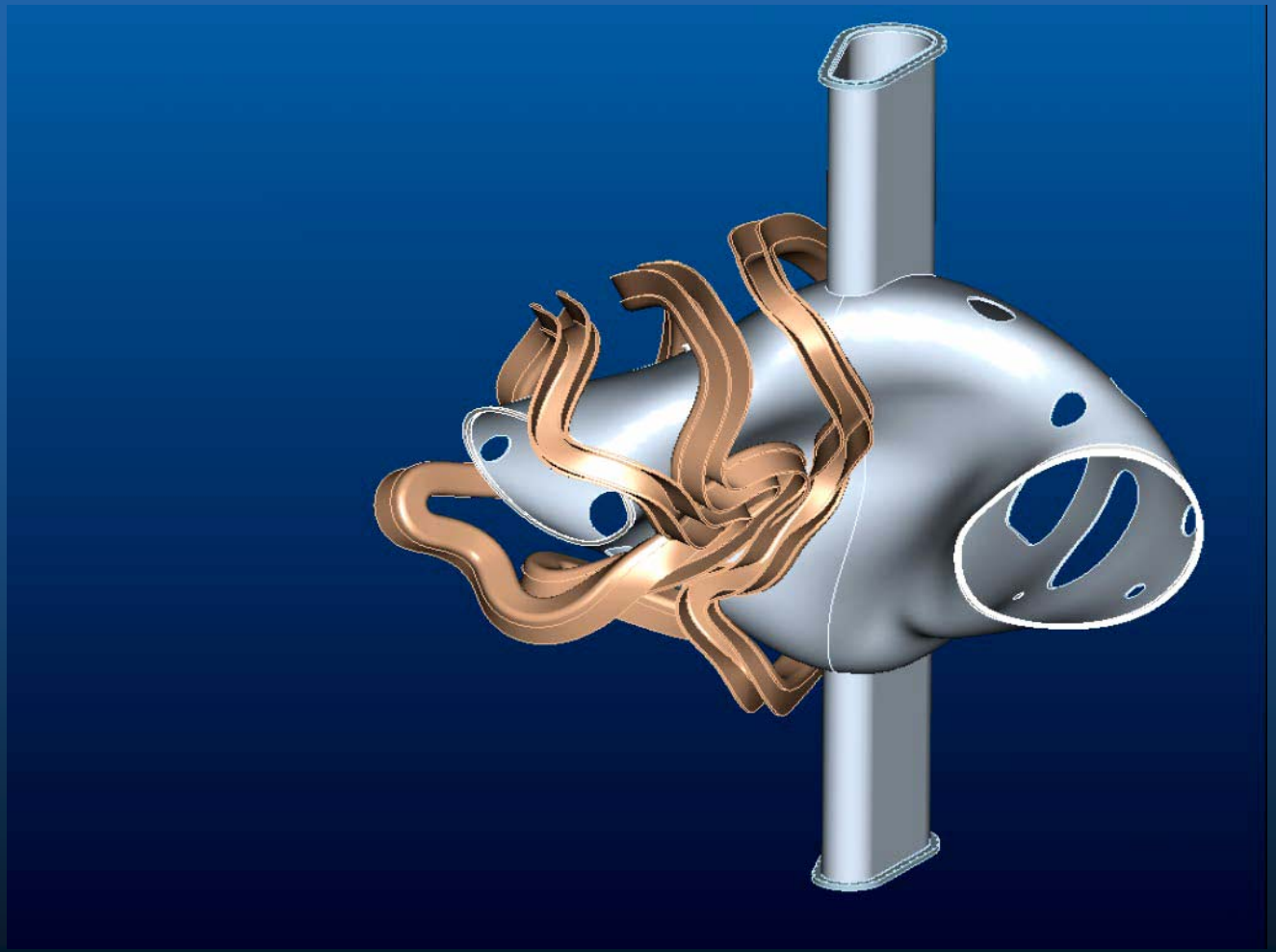
NCSX Machine Assembly Steps

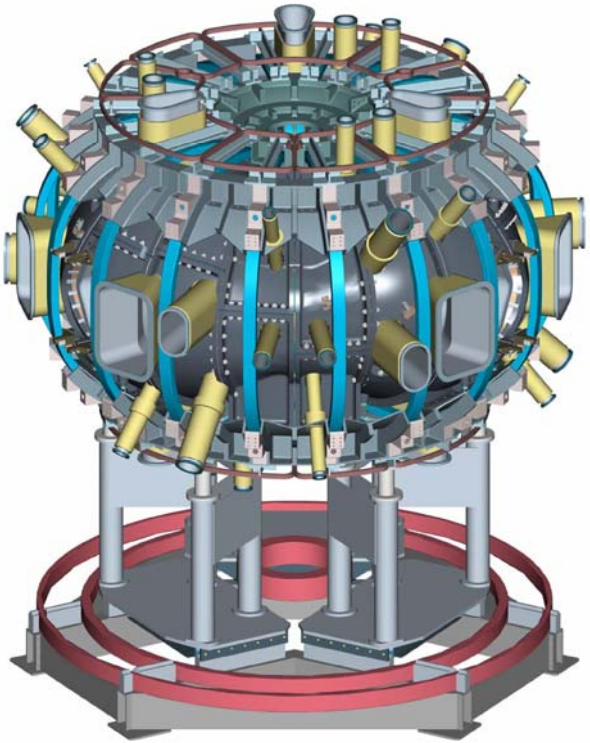
- Install Field Period Assembly #3
- The final FPA is mounted to the remaining carriage assembly.
- Location checks will be made to verify that the assembly of the FPA's has been performed correctly



NCSX Machine Assembly Steps

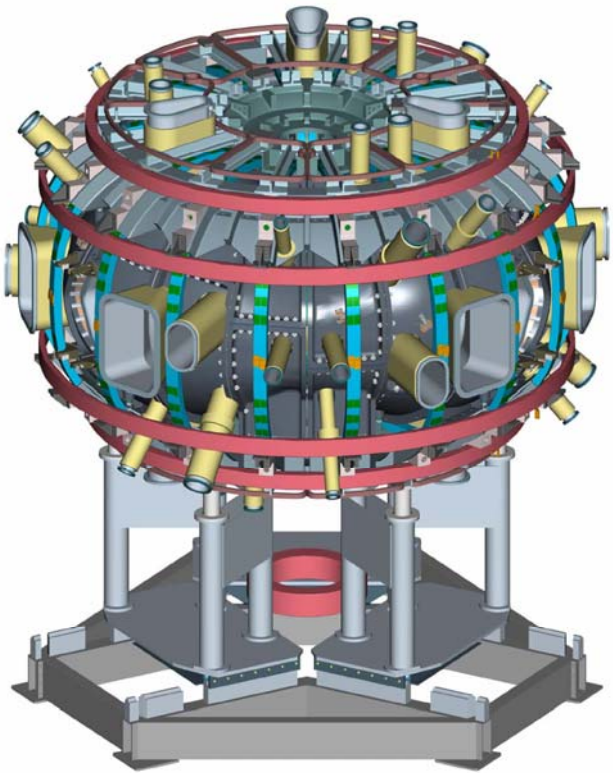
- Position Spool Piece and insulation
- In preparation for the assembly of the vacuum vessel three spool pieces will be positioned between each FPA. As the FPA's are moved to the final machine position the position of the spool piece is adjusted for fit up with the vacuum vessel period.





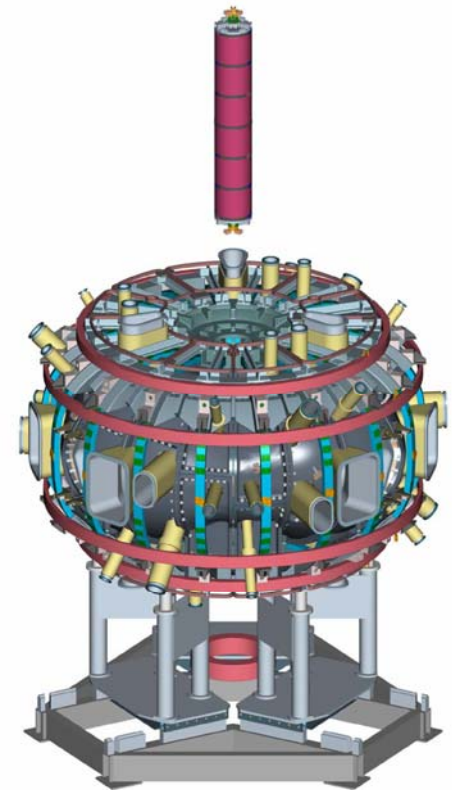
NCSX Machine Assembly Steps

- Position and clamp Field Period Assembly 1, 2, & 3.
- The FPA position will be checked to verify the assembly is installed with in tolerance.
- The spool piece assembly is welded to form the completed vacuum vessel.
- Blank off flanges will be installed on the vessel and the vessel leak tested.
- The vacuum vessel is adjusted using the vertical supports attached to the Modular Coil Shell.
- Final bolting of the mating Modular Coil joints will be performed.
- Final radial position of the TF coil will be made and the TF Coil locations checked.



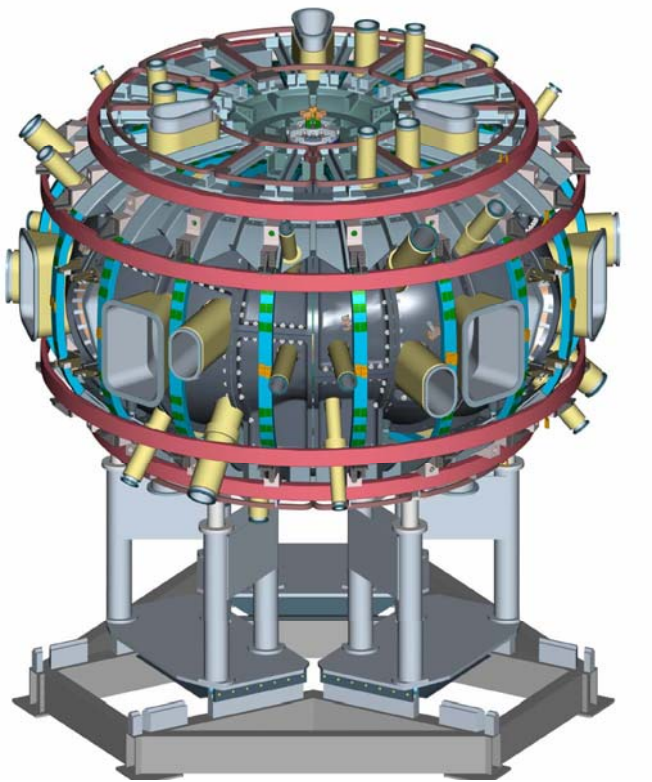
NCSX Machine Assembly Steps

- Raise lower PF5 and 6. Install PF supports. Repeat for upper PF5 and 6. The lower PF4 remains in a temporary position.
- Location data will be taken of the PF Coils to verify position location.



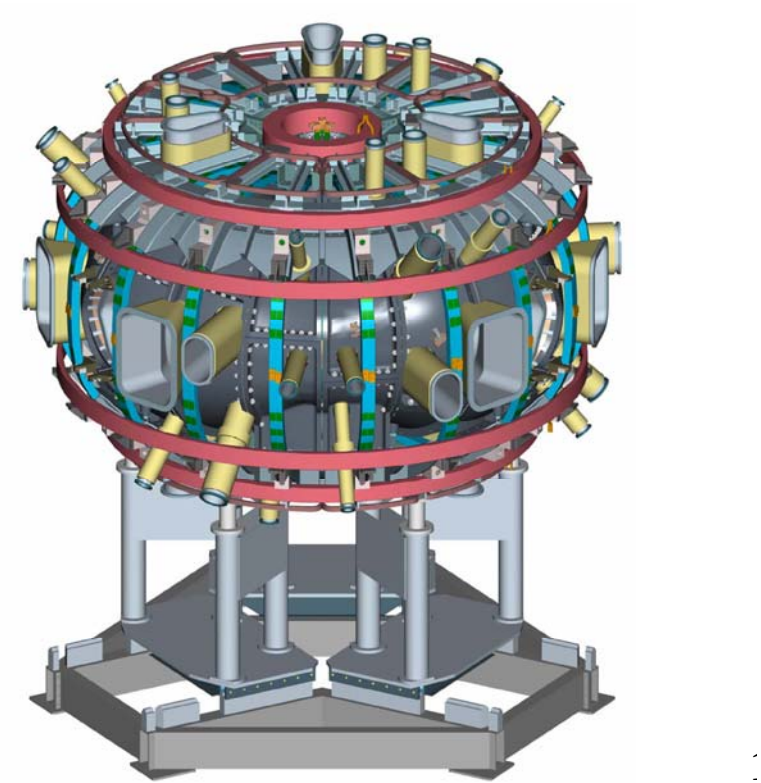
NCSX Machine Assembly Steps

- Lift center stack and prepare for installation
- The center stack will be lifted by the overhead crane and raised above the machine assembly.



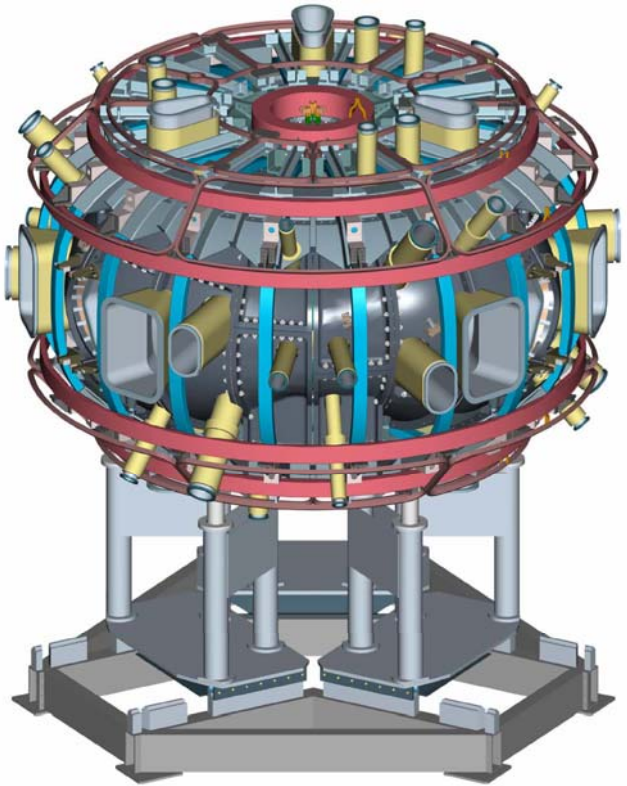
NCSX Machine Assembly Steps

- Install center stack into position and mount.
- The center stack is lowered into position and mounted to the Modular Coil Shell.
- The lower PF4 Coil is raised and also mounted to the Modular Coil Shell
- Measurement data will be taken to verify location of the Center Stack and lower PF4 coil position.



NCSX Machine Assembly Steps

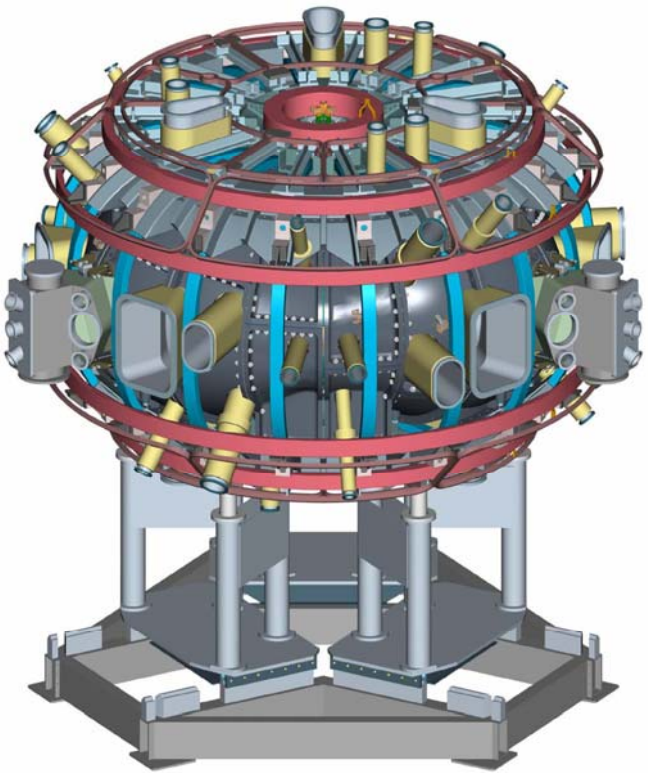
- Install and mount upper PF4
- The upper PF4 coil is mounted and checked for correct position requirements.



NCSX Machine Assembly Steps

- Install upper and lower External Trim Coils
- The upper and lower outer External Trim Coils are mounted to the TF Coil support structure.
- Positional location is checked.

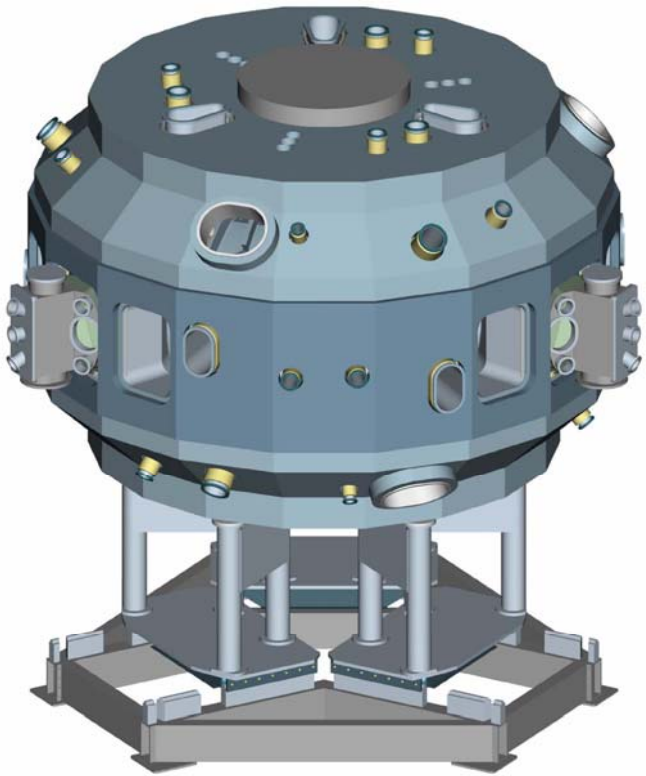
NCSX Machine Assembly



NCSX Machine Assembly Steps

- Install Neutral Beam Transition Duct
- The Neutral Beam transition ducts are mounted to the Neutral Beam port flange.
- Anti rotation supports that limit the rotational movement of the vacuum vessel are installed between the Modular Coils and the Neutral Beam Transition Ducts.

NCSX Machine Assembly



NCSX Machine Assembly Steps

- Install Cryostat
- Stellarator Core Assembly Complete.